

ARCHIVES OF Biochemistry and Biophysics

Volume 132 • 1969

Executive Editors

R. W. Estabrook
V. Ginsburg
C. H. W. Hirs

F. M. Huennekens
S. Kaufman

H. S. Mason
F. F. Nord

P. K. Stumpf
S. Udenfriend
W. J. Whelan

Editors

S. J. Ajl
G. Ashwell
A. Bendich
J. Botts
R. D. Cole
E. H. Cordes
H. Edelhoch
H. V. Gelboin
D. E. Green
O. Greengard
F. Gros
E. Gross
L. P. Hager
H. O. Halvorson
D. J. Hanahan
Y. Hatefi
O. Hayaishi

L. A. Heppel
R. L. Hill
L. E. Hokin
B. L. Horecker
F. E. Hunter
H. A. Itano
A. T. Jagendorf
H. M. Kalckar
E. Katchalski
W. Kauzmann
T. E. King
A. Kleinzeller
I. M. Klotz
W. Konigsberg
D. Kritchevsky
J. M. Lowenstein
F. Lynen

H. R. Mahler
B. G. Malmstrom
C. L. Markert
A. S. Mildvan
L. Packer
G. Palmer
L. H. Piette
H. C. Pitot
G. Popjak
R. R. Porter
J. Preiss
J. C. Rabinowitz
N. S. Radin
L. J. Reed
H. Rudney
D. R. Sanadi
A. San Pietro

W. A. Schroeder
M. Sela
E. N. Shaw
D. Shemin
P. Siekevitz
M. V. Simpson
A. G. Szent-Györgyi
T. T. Tchen
S. N. Timasheff
O. Touster
C. R. Treadwell
B. Vennesland
G. Weber
H. Weissbach
C. A. West
I. Zelitch
D. M. Ziegler



ACADEMIC PRESS
New York and London

Copyright © 1969, by Academic Press, Inc.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form by photostat, microfilm, by retrieval system, or any other means, without written permission from the publishers.

Made in the United States of America

FROZEN
01/21/98

Contents of Volume 132

NUMBER 1, JUNE 1969

SABURO FUKUI, NOBUKO OHISHI, YOSHIHARU NAKAI, AND FUMINORI MASUGI. Properties and Catalytic Activities of ω -Hydroxy Derivatives of Vitamin B ⁶	1
P. J. ORIEL. The Therman and Alkaline Degradation of MS2 Bacteriophage.....	8
BENEDICT GOMES, IKUO IGAUE, HANS G. KLOEPPER, AND KERRY T. YASUNOBU. Amine Oxidase XIV. Isolation and Characterization of the Multiple Beef Liver Amine Oxidase Components.....	16
BENEDICT GOMES, GWEN NAGUWA, HANS G. KLOEPPER, AND KERRY T. YASUNOBU. Amine Oxidase XV. The Sulfhydryl Groups of Beef Liver Mitochondrial Amine Oxidase.....	28
EDWIN H. EYLAR, JONAS SALK, GEORGE C. BEVERIDGE, AND LENORA V. BROWN. Experimental Allergic Encephalomyelitis: An Encephalitogenic Basic Protein from Bovine Myelin.....	34
RAY J. BUCCINO, JR. AND JAY S. ROTH. Partial Purification and Properties of ATP:GMP Phosphotransferase from Rat Liver.....	49
EDWARD A. SMUCKLER AND MARLENE KOPLITZ. The Effects of Carbon Tetrachloride and Ethionine on RNA Synthesis <i>in Vivo</i> and in Isolated Rat Liver Nuclei.....	62
RICHARD W. ARMENTROUT AND RUSSELL F. DOOLITTLE. Pyroglutaminyl Carboxypeptidase: Stabilization and Purification.....	80
F. KAPLAN, P. SETLOW, AND N. O. KAPLAN. Purification and Properties of a DPNH-TPNH Diaphorase from <i>Clostridium kluyveri</i>	91
JEFFREY F. MCKELVY AND Y. C. LEE. Microheterogeneity of the Carbohydrate Group of <i>Aspergillus oryzae</i> α -Amylase.....	99
ARMANDO J. PARODI, JOSÉ MORDOH, CLARA R. KRISMAN, AND LUIS F. LELOIR. <i>In Vitro</i> Synthesis of Particulate Glycogen from Uridine Diphosphate Glucose.....	111
H. R. KABACK AND T. F. DEUEL. Proline Uptake by Disrupted Membrane Preparations from <i>Escherichia coli</i>	118
JOHN J. VAN BUSKIRK AND WILHELM R. FRISSELL. Inhibition by Formaldehyde of Energy Transfer and Related Processes in Rat Liver Mitochondria II. Effects on Energy-Linked Reactions in Intact Mitochondria and Phosphorylating Particles.....	130
JOYCE H. JOHNSON AND BERTON C. PRESSMAN. Rates of Exchange of Mitochondrial Mg ²⁺ Determined from ²⁸ Mg Flux Measurements.....	139
DAVID LEE MILLER AND HERBERT WEISSBACH. An Interaction between the Transfer Factors Required for Protein Synthesis.....	146
ROBERT C. HODSON AND JEROME A. SCHIFF. Preparation of Adenosine-3'-Phosphate-5'-Phosphosulfate (PAPS): An Improved Enzymatic Method Using <i>Chlorella pyrenoidosa</i>	151
J. S. BELLIN, L. LUTWICK, AND B. JONAS. Effects of Photodynamic Action on <i>E. Coli</i> ..	157
SERGE N. TIMASHEFF. On the Mechanism of α -Chymotrypsin Dimerization.....	165
LARRY MILNER AND HERBERT WEISSBACH. Inhibition by L-Methionine of the Growth of <i>Euglena gracilis</i> in a Glutamic Acid Medium.....	170
NABEEL F. ADHAM, ZAVEN H. CHAKMAKJIAN, JOHN W. MEHL, AND JOHN E. BETHUNE. Human Growth Hormone and α_4 -Macroglobulin: A Study of Binding.....	175
T. OGINATA. The Myosin of Developing Chick Embryo.....	184
B. B. BISWAS. Ribosomes in Cotyledons of Mungbean Seeds at Different Stages of Germination.....	198
LLOYD L. INGRAHAM AND H. JOHANSEN. Electronic Structure of the Proflavine Cation.....	205
D. C. BEITZ, H. W. MOHRENWEISER, J. W. THOMAS, AND W. A. WOOD. Synthesis of	

Milk Proteins in a Cell-Free System Isolated from Lactating Bovine Mammary Tissue.....	210
H. R. ADAMS, RUTH N. WRIGHTSTONE, A. MILLER, AND T. H. J. HUISMAN. Quantitation of Hemoglobin α Chains in Adult and Fetal Goats; Gene Duplication and the Production of Polypeptide Chains.....	223
J. B. MUDD AND T. T. McMANUS. Products of the Reaction of Peroxyacetyl Nitrate with Sulfhydryl Compounds.....	237
THOMAS R. HENDERSON, ROGENE F. HENDERSON, AND GREGORY E. JOHNSON. The Effect of Dimethyl Sulfoxide on the Allosteric Transitions of Glutamic Dehydrogenase.....	242
C. IOPPOLO, E. CHIANCONE, E. ANTONINI, AND J. WYMAN. Dissociation of Fetal Hemoglobin by <i>p</i> -Chloromercuribenzoate and Preparation of Native γ Chains.....	249
T. AKAZAWA, K. SATO, AND T. SUGIYAMA. Structure and Function of Chloroplast Proteins VIII. Some Properties of Ribulose-1,5-diphosphate Carboxylase of Athiorhodaceae in Comparison with Those of Plant Enzyme.....	255
V. V. SUBBA REDDY, H. N. JAYARAM, M. SIRSI, AND T. RAMAKRISHNAN. Inhibitory Activity of L-Asparaginase from <i>Mycobacterium tuberculosis</i> on Yoshida Ascites Sarcoma in Rats.....	262
M. WAKS, A. ALFSEN, S. SCHWAIGER, AND A. MAYER. Structural Studies of Haptoglobins. III. Interactions with Hemoglobin.....	268
NICHOLAS CATSIMPOOLAS AND EDWIN W. MEYER. Isolation of Soybean Hemagglutinin and Demonstration of Multiple Forms by Isoelectric Focusing.....	279
G. RAPOPORT, L. DAVIS, AND B. L. HORECKER. The Subunit Structure of the Fructose Diphosphate Aldolase from Spinach Leaf.....	286
KARL F. GUTHE. Hydrostatic Pressure Effects on Rabbit and Echinoderm Myosin ATPase.....	294
MARTIN J. GRIFFIN. Separation and Characterization of HeLa Alkaline Pyrophosphatase Isoenzymes.....	299
GENE L. COTTAM AND RAYMOND L. WARD. ^{35}Cl -NMR Studies on Zinc-Pyruvate Kinase Complexes.....	308
T. S. ANANTHA SAMY, HAROLD PAPKOFF, AND CHOH HAO LI. The Reaction of Cyanogen Bromide with an Ovine ICSH Subunit: The Sequence of NH_2 -Terminal Forty Amino Acids.....	315
C. L. SIA, S. TRANIELLO, S. PONTREMOLI, AND B. L. HORECKER. Studies on the Subunit Structure of Rabbit Liver Fructose Diphosphatase.....	325
T. A. KRULWICH, M. ENSER, AND B. L. HORECKER. The Effects of Pyridoxal Phosphate on Rabbit Liver and Kidney Fructose 1,6-Diphosphatases.....	331
THEODOSIOS PAVLIDIS AND WALTER KAUZMANN. Toward a Quantitative Biochemical Model for Circadian Oscillators.....	338

COMMUNICATIONS

P. P. SHAH AND EZRA STAPLE. Formation of CoA Esters of DihydroxychoLANic Acids.....	349
MARION P. CULLEN, HAROLD TARVER, AND SHELDEN MARGEN. The Preparation of Serum Albumin for Turnover Studies.....	351
ICHIO NOGUCHI AND SHŌJI MORI. Enzymic Degradation of Rutin in <i>Fagopyrum vulgare</i> Leaves.....	352
H. OPPENHEIMER, K. BÁRÁNY, AND J. FENTON. Protein Resembling Subfragment 1 by the Tryptic Digestion of Myosin at Low Ionic Strength in the Presence of Calcium.....	354
Author Index.....	357

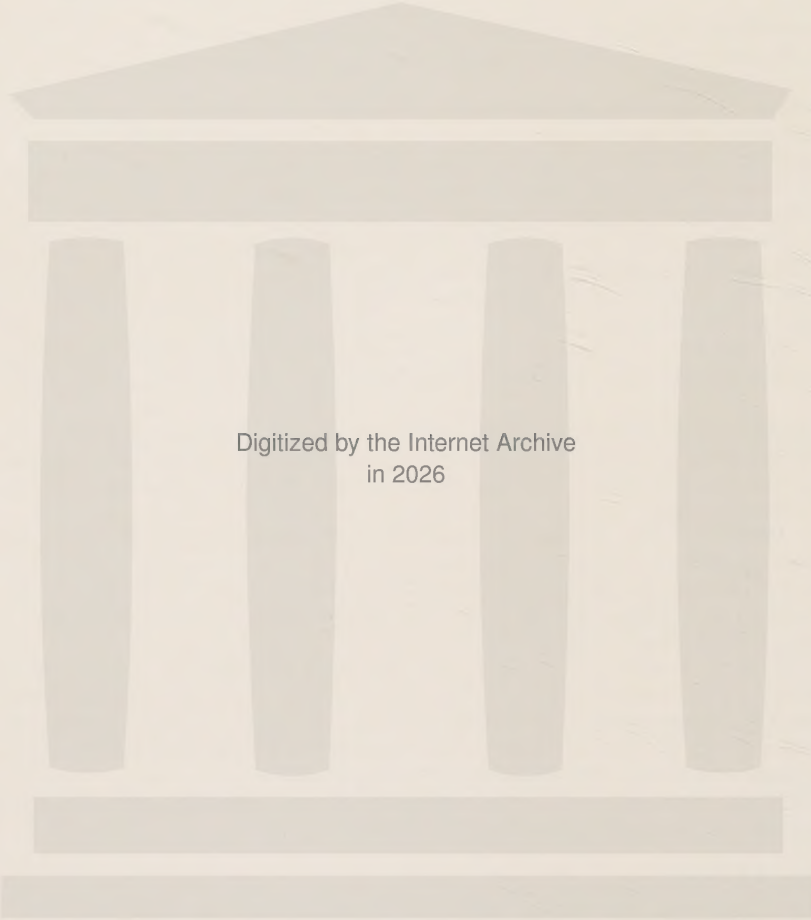
NUMBER 2, JULY 1969

HIDEO KOCHI AND GORO KIKUCHI. Reactions of Glycine Synthesis and Glycine Cleavage Catalyzed by Extracts of <i>Arthrobacter globiformis</i> Grown on Glycine.....	359
L. E. PERGLUT AND K. AMEMIYA. The Effects of Physiological Concentrations of Mg^{++} and K^+ on the Temperature-Absorbancy Curve of DNA.....	370
MARTIN POE. Kinetic Studies of Temperature Changes and Oxygen Uptake in a Differential Calorimeter: Energy Balance during Calcium Accumulation by Mitochondria.....	377

JAMES E. ESTES AND CARL MOOS. Effect of Bound-Nucleotide Substitution on the Properties of F-Actin.....	388
W. EUGENE KNOX, ANNEMARIE HERZFELD, AND JULIA HUDSON. Phosphoserine Phosphatase Distribution in Normal and Neoplastic Rat Tissues.....	397
LOUIS A. SORDAHL, ZACK R. BLALOCK, GWENDOLY H. KRAFT, AND ARNOLD SCHWARTZ. The Possible Relationship between Ultrastructure and Biochemical State of Heart Mitochondria.....	404
J. R. MCLEAN AND DORIS POTOCZAK. The Effects of Sodium and Potassium on Norepinephrine Uptake by Rabbit Platelets and the Inhibition of this Process by Drugs.....	416
I-YIH HUANG, EDWARD J. SCHANTZ, AND MERLIN S. BERGDOLL. The Preparation and Enzymatic Digestion of Oxidized, Reduced, and Alkylated Enterotoxin B.....	423
MADLINE WU AND JACK MYERS. A Fluorescent Protein Factor from Spinach Chloroplasts.....	430
JEROME BIRNBAUM. Coenzyme Repression of Acetyl-CoA Carboxylase by (+)-Biotin.....	436
ANTON N. J. HEYN. Glucanase Activity in Coleoptiles of <i>Avena</i>	442
KENNETH D. LUNAN AND H. K. MITCHELL. The Metabolism of Tyrosine- <i>O</i> -Phosphate in <i>Drosophila</i>	450
J. ZALITIS AND DAVID SIDNEY FEINGOLD. Purification and Properties of UDPG Dehydrogenase from Beef Liver.....	457
J. C. HSIA AND L. H. PIETTE. Spin-Labeled Hapten Studies of Structure Heterogeneity and Cross-Reactivity of the Antibody Active Site.....	466
CARLOS GEORGE-NASCIMENTO, ENRIQUE BEYTIA, ANA ROSA AEDO, AND OSVALDO CORI. Transformation of Mevalonic Acid into Isoprenoid Compounds by Enzymes from <i>Pinus radiata</i> . Activation of the Overall Reaction by Phospholipids.....	470
DONALD SPENCER AND PAUL R. WHITFIELD. The Characteristics of Spinach Chloroplast DNA Polymerase.....	477
KAZUYUKI MORIHARA, TATSUSHI OKA, AND HIROSHIGE TSUZUKI. The Compound Active Site of <i>Bacillus subtilis</i> Neutral Protease: Some Properties of Six Subsites.....	489
ALLEN B. EDMUNDSON, NANNE B. SIMONDS, FLORENCE A. SHEBER, TIMOTHY JOHNSON, AND BETTY BANGS. Use of Carboxypeptidase A for Simultaneous Assessment of Purity and Assignment of Human Bence Jones Proteins and Light Chains to K and L Classes.....	502
GEORGE A. BLONDIN AND DAVID E. GREEN. Mechanism of Mitochondrial Swelling III. Two Forms of Energized Swelling.....	509
JUNPEI ASAI, GEORGE A. BLONDIN, WILLIAM J. VAIL, AND DAVID E. GREEN. The Mechanism of Mitochondrial Swelling IV. Configurational Changes during Swelling of Beef Heart Mitochondria.....	524
ROBERT A. HARRIS, MARY ANN ASBELL, JUNPEI ASAI, WALTER W. JOLLY, AND DAVID E. GREEN. The Conformational Basis of Energy Transduction in Membrane Systems VI. Measurement of Configurational Changes by Light Scattering.....	545
L. B. FOSTER AND B. H. SELLS. Functional Capacity of Intact and Hybrid Ribosomes from Livers of Normal and Hypophysectomized Rats.....	561
STEPHEN KELLER, MICHAEL M. LEVI, AND INES MANDL. Antigenicity and Chemical Composition of an Enzymatic Digest of Elastin.....	565

COMMUNICATIONS

JENNY PICKWORTH GLUSKER, JEAN A. MINKIN, CAROL ANN CASCIATO, AND FREDERIC B. SOULE. Absolute Configurations of the Naturally Occurring Hydroxycitric Acids.....	573
ROBERT E. McMAHON, HUGH R. SULLIVAN, J. CYMERMAN CRAID, AND WILFRED E. PEREIRA, JR. The Microsomal Oxygenation of Ethyl Benzene: Isotopic, Stereochemical and Induction Studies.....	575
Errata.....	578
Author Index.....	580
Subject Index.....	582



Digitized by the Internet Archive
in 2026

Medicine and Sport, Vol. 3
Editor: E. Jokl (Lexington, Ky.)

Published for and on behalf of Research Committee International Council
of Sport and Physical Education UNEVCO

Biochemistry of Exercise

Proceedings of the First International Symposium on Exercise
Biochemistry, Brussels 1968

Edited by J.R. Poortmans (Brussels)

X + 384 p., 127 fig., 83 tab., 1969. SFr./DM 97.— / US \$ 23.30 / 194 s.

The Biochemistry of Muscular Exercise is quite a young and growing science. At the International Symposium held in June 1968 in Brussels, the leading specialists of this biological field have surveyed a variety of aspects which involve the humoral modifications occurring during physical activity. Among 73 papers presented at this first symposium, 58 have been selected for publication and these are devoted to several topics: blood gases and acid-base chemistry, carbohydrate and lipid metabolisms, hormones, enzymes, electrolytes, proteins in biological fluids. This collection of papers follows closely the latest trends of research and report on recent results. They are, therefore, a valuable source of information to workers in the field of biochemistry of Muscular Activity. The subject of this symposium is sure to grow in importance in the coming years and this record will prove to be a valuable pioneer book to all scientists involved in sports medicine, physiological chemistry and biology.

Previously published in this series:

Vol. 1: Exercise and Altitude

Edited by E. Jokl (Lexington, Ky.) and P. Jokl (New Haven, Conn.)

VIII + 200 p., 47 fig., 24 tab., 1968. SFr./DM 58.— / US \$ 13.90 / 116 s.

Vol. 2: Biomechanics — Technique of Drawings of Movement and Movement Analysis

Edited by J. Wartenweiler (Zürich); E. Jokl (Lexington, Ky.) and M. Hebbelinck (Brussels)

XXIV + 352 p., 216 fig., 17 tab., 1969. SFr./DM 80.— / US \$ 19.20 / 160 s.

In preparation:

Vol. 4: Physical Activity and Aging

Edited by D. Brunner (Tel Aviv) and E. Jokl (Lexington, Ky.)

Vol. 5: Sudden Cardiac Death Associated with Physical Exertion

Edited by E. Jokl (Lexington, Ky.)

S. Karger

Basel (Switzerland)

New York

Third Edition

Introduction to MODERN BIOCHEMISTRY

By **PETER KARLSON**

University of Marburg, Germany

Translated from the German by

CHARLES H. DOERING

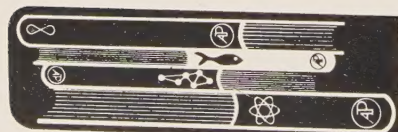
Stanford University

Based on the two latest German editions, this revision of Professor Karlson's highly successful textbook presents the latest trends and insights in biochemical studies. It provides a completely integrated guide to the basic theories, established procedures and modern research applications of biochemical research.

The chapter on proteins has been reworked, and the dynamic aspect of protein structure, particularly allosteric changes, has been emphasized. The entire genetic code is now included in the chapter on nucleic acids, and new material on the origin of life has been added. Other new features include a strengthened treatment of enzyme kinetics and metabolism, hormones and photosynthesis; improved classification of RNA; and the utilization of the R-S system of designating stereo-chemical configuration. There are many new illustrations.

1968, 483 pp., \$11.75

AP 2309



Academic Press

NEW YORK AND LONDON

111 FIFTH AVENUE, NEW YORK, N.Y. 10003
BERKELEY SQUARE HOUSE, LONDON W.1



CELL AND MOLECULAR BIOLOGY

By **ERNEST J. DuPRAW**

University of Maryland

This text focuses on the area where molecular and cell biology overlap, developing the concept of a single science dealing with the question: "How are cells organized to be alive?" Both biochemical and ultrastructural topics are considered, and as much data as is meaningful from all relevant disciplines is employed. Throughout the book and particularly in the first chapter the author stresses the distinction between observation and interpretation, ultimately emphasizing conceptualization.

Many original electron micrographs of exceptional quality and outstanding research illustrations from almost 100 other authors are significantly used, and there is extensive documentation as a guide to further study and research.

CONTENTS:

Preface. Historical Perspectives. Free Energy and Entropy. The Biochemistry of Energy Transfer. Photosynthesis as a Reaction. Chloroplasts and Other Photosynthetic Organelles. Energy-Releasing Processes. Mitochondria and Related Organelles. Muscle Cells and Contractility. Primitive Mechanisms of Motility. The Plasma Membrane and its Derivatives: Structure and Properties. The Plasma Membrane and its Derivatives: Energetics. Physical Chemistry of Proteins, Nucleic Acids, and Nucleoproteins. Cell-Free Synthesis of Nucleic Acids. Cell-Free Synthesis of Proteins. The Organization of Genetic Material in Microorganisms. Synthesis in Nucleated Cells: The Cytoplasm. Synthesis in Nucleated Cells: The Interphase Nucleus. Organization of Genetic Material in Eukaryotic Chromosomes. Cell Division. Eggs and Embryos as Cell Systems. References. Subject Index.

1968, 739 pp., \$12.50

AP 2282



Academic Press

NEW YORK AND LONDON

111 FIFTH AVENUE, NEW YORK, N.Y. 10003
BERKELEY SQUARE HOUSE, LONDON W.1



The Hallucinogens

By **A. Hoffer**

Formerly, Director, Psychiatric Research
Psychiatric Services Branch
Department of Public Health, Saskatoon, Saskatchewan, Canada

H. Osmond

Director, Bureau of Research in Neurology and Psychiatry
New Jersey Neuro-Psychiatric Institute, Princeton, New Jersey

"The use of hallucinogens has been described as one of the major advances of this century. There is little doubt that they have had a massive impact upon psychiatry and may produce marked changes in our society. The violent reaction for and against the hallucinogens suggests that, even if these compounds are not universally understood and approved of, they will neither be forgotten nor neglected."

—FROM THE AUTHORS' PREFACE

CONTENTS:

PLANT β -PHENETHYLAMINES

d-LYSERGIC ACID DIETHYLAMIDE

OLOLIUQUI: THE ANCIENT AZTEC
NARCOTIC

ADRENOCHROME AND SOME OF ITS
DERIVATIVES

INDOLE HALLUCINOGENS DERIVED FROM
TRYPTOPHAN

HALLUCINOGENS RELATED TO
PARASYMPATHETIC BIOCHEMISTRY

TARAXEIN

ANIMAL STUDIES OF HALLUCINOGENIC

DRUGS, T. Weckowicz

AUTHOR INDEX—SUBJECT INDEX.

1967, 626 pp., \$25.00

AP 1971



Academic Press

NEW YORK AND LONDON

111 FIFTH AVENUE, NEW YORK, N.Y. 10003
BERKELEY SQUARE HOUSE, LONDON W.1

